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THE GAME FISHES OF INDIA.[1]

BY

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(*With one plate and four text-figures*).

Continued from page 678 *of Vol.* xxxix.

IV.—The Silond Catfish.

Silonia silondia (Hamilton).

Contents.

	PAGE
Introduction	137
Nomenclature and Systematic Position	138
Synonymy and Description	141
Bionomics and Fishing Notes	144
Acknowledgments	146
List of References	146
Explanation of Plate	147

Introduction.

Among a great variety of Indian Catfishes, there are four species, *viz.*, *Silonia silondia* (Ham.), *Pangasius pangasius* (Ham.), *Bagarius bagarius* (Ham.) and *Wallagonia attu*[2] (Bloch), which attain a size of about five to seven feet in length, and on account of their voracious habits and powerful build are sometimes called 'Freshwater Sharks'. They cause considerable damage to fisheries

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[1] Published with permission of the Director, Zoological Survey of India.

[2] Myers (*Copeia*, p. 98, June 1938) has restricted the use of the generic denomination *Wallago* to *W. dinema* Bleeker and has included the Indian species in his new genus *Wallagonia*.

NOV - 5 1938

and are very undesirable in several respects. However, they provide considerable sport to anglers, and are regarded game fishes of no mean value. The present article deals with the *Silond* Catfish, which is perhaps the most powerful of all the four species enumerated above and whose flesh is certainly more prized than that of the others. The following three articles will be devoted to the treatment of the three other so-called freshwater sharks.

Nomenclature and Systematic Position.

Hamilton (**3**)[1] who discovered the *Silond* Catfish for science, named it *Pimelodus silondia*, but later workers regarded Hamilton's *Pimelodus* as a generalised, composite genus and split up his group of 33 species into several genera. Swainson (**6**) removed the first two species of Hamilton's *Pimelodus*—*P. silondia* and *P. chandramara*, to a new subgenus *Silonia* of *Ageniosus* (*sic*) which was defined as follows:—

> 'Body of equal thickness with the head, which is not dilated; eyes very large; cirri two, very minute; adipose dorsal very small, oval; gill-membrane ten-rayed; ventral fin beneath the first dorsal; caudal fin slightly lunate.'

The two species included by Swainson under *Silonia*, *S. lurida* Sw. (=*P. silondia* Ham.) and *S. diaphina* Sw. (=*P. chandramara* Ham.), are quite different from each other, except that both were characterised by Hamilton as possessing only two barbels. *P. silondia* is, however, designated as the type of the species and it is to the fishes of this kind that the generic designation of *Silonia* is now applied.

Probably being unaware of Swainson's classification, Cuvier and Valenciennes (**1**) also proposed a new genus *Silundia* for the same two species of Hamilton's *Pimelodus* and characterised it as follows:—

> 'Les Silondies sont des siluroïdes, voisines des Bagres, à petite tête lisse, fort semblable à celle des schilbes, à très-petite nageoire dorsale adipeuse, à longue nageoire anale, qui n'ont que deux barbillons maxillaires, et tellement petits, qu'il faut de l'attention pour des découvrir. Leurs rayons branchiostèges sont au nombre de douze. Leurs dents de mâchoires, sur un on deux rangs seulement, sont plus longues et moins semées que dans les autres siluroïdes. Nous n'en connaissons bien qu'une espèce le *pimelodus silundia* de Buchanan; mais il me paraît que le *pimelodus chandramara* du même auteur s'en rapproche au moins beaucoup.'

Cuvier and Valenciennes changed the specific name of *Silond* to *Silundia gangetica* and the later workers adopted this name without any reference to Swainson's earlier work. As *Silonia* Swainson has priority over *Silundia* Cuvier and Valenciennes, in accordance with the International Rules of Zoological Nomenclature the species must now be designated as *Silonia silondia* (Hamilton).

As recognised here *Silonia* is a monotypic genus. Some authors have regarded Sykes' (**7**) *Ageneiosus childreni* as a doubtful member of this genus but I (**4**) have placed it in a separate genus *Silonopangasius* Hora. Day (**2**) described a new species of

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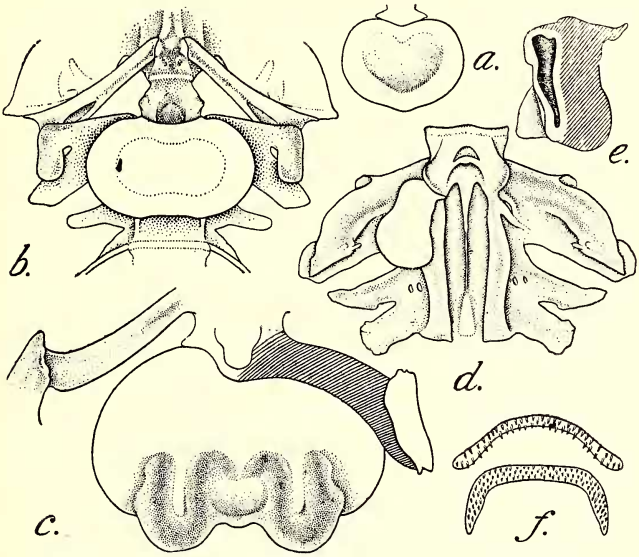
[1] Numerals in thick type within brackets refer to the serial numbers of the various publications listed in the bibliography at the end of the paper.

Silundia, *S. sykesii*, from Deccan and was doubtfully of the opinion that it may be synonymous with Sykes' *childreni*. In the collection of the Zoological Survey of India there is a considerable material of the Deccan form. Though both the species possess caniniform teeth which project outside the mouth-opening, *Silonopangasius childreni* has two pairs of barbels while *Silonia silondia* has only one pair. The structure of the air-bladder is also different in the two species. Moreover, the Deccan form rarely exceeds a foot and a half in length.

Taylor, Day, and Bridge and Haddon described the air-bladder of *S. silondia*,[1] but their accounts differ greatly from one another. On dissecting a number of specimens of various sizes it was observed that the form of the air-bladder undergoes considerable changes during growth. I reproduce here (text-fig. 1) four drawings of the air-bladders of specimens 53 mm., 131 mm., 237 mm. and



Text-fig. 1.—Air-Bladder, associated skeletal structures, and dentition of *Silonia silondia* (Ham.).

a. Air-bladder of a specimen 53 mm. in length without caudal. ×3; *b*. Air-bladder of a specimen 131 mm. in length without caudal. ×3; *c*. Air-bladder of a specimen 237 mm. in length without caudal. ×$2\frac{1}{2}$. The portion shaded by section lines represents a strong fibrous structure by which the bladder is attached to the neighbouring skeletal elements; *d*. Air-bladder of a specimen about 1.070 mm. in length without caudal. ×$\frac{1}{2}$. The bladder from the right side is removed to show the nature of the bones to which it is firmly attached; *e*. Longitudinal horizontal section of the air-bladder shown in *d*. ×$\frac{3}{4}$. The portion shaded by section lines represents the solid, fibrous part of the bladder, while its cavity is shaded black with dots; *f*. Upper dentition of a specimen 237 mm. in length without caudal. Nat. size.

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[1] For references to the accounts of Taylor, Day, and Bridge and Haddon see the synonymy of the species on page 141.

1,070 mm. in length without the caudal, respectively. In both the earlier stages the form corresponds with that described by Bridge and Haddon, while that of the third specimen approaches the type described by Day. Fortunately, Taylor noted that his specimen was about 8 pounds in weight, so he was certainly dealing with a much larger specimen than those examined either by Day or by Bridge and Haddon. Taylor's description more or less corresponds with the form of the bladder of the largest specimen examined by me. Nair (5) has recently given an account of the changes in the internal structure of the air-bladder of *Silonia silondia* during growth.

The genus *Silonia* may now be defined as follows:—

The body is elongated and compressed. The head and body are covered with soft skin. The head is of moderate size and is rounded anteriorly. The median fontanel extends throughout the length of the head. The occipital process is sharply pointed posteriorly and there is a considerable space between it and the basal bone of the dorsal fin. The eyes are situated laterally behind the angle of the mouth and are visible both from above and below; they are provided with circular adipose lids. The mouth is anterior, wide and obliquely directed upwards. The lower jaw is somewhat longer than the upper and broadly pointed in the middle. The teeth in the jaws are large and caniniform; they project outside the mouth-opening. There is a continuous U-shaped band of villiform teeth across the palate. The lips are well developed near the angles of the mouth and are continuous. The post-labial groove is widely interrupted in the middle. The nostrils are situated wide apart and are slit-like; the anterior nostrils are along the front edge of the snout while the posterior ones are placed backwards and inwards. There are only two small maxillary barbels which lie in grooves and are liable to be overlooked. The dorsal fin is situated considerably in advance of the ventrals; it is provided with a moderately developed bony spine which is roughened externally and serrated internally. A small adipose dorsal is present in the last fourth of the body length. The anal fin is very long. The pectoral fin is provided with a strong, bony spine which is roughened externally and serrated internally. The pelvic fins possess 6 rays each. The caudal fin is deeply forked. The gill-openings are wide. The gill-membranes are deeply notched; they are united with each other but are free from the isthmus. There are 11-12 branchiostegal rays. The air-bladder is greatly reduced, thick-walled and uniform in the earlier stages; it has its long axis transversely disposed and lies across the body of the anterior, modified vertebrae. It is not enclosed in bone but is supported laterally by the transverse processes of the fourth vertebrae.

Genotype:—*Silonia lurida* Swainson 1838=*Pimelodus silondia* Hamilton 1822.

Distribution:—Same as of the only species, *vide infra*, p. 143.

Relationships:—*Silonia* belongs to the family Schilbeidae of the order *Siluroidea*. This family is represented by a number of genera both in the Oriental and the Ethiopian Regions. As I (4) have remarked elsewhere *Silonia* with one pair of barbels is probably a primitive form in the family, though owing to its highly predaceous habits it has developed large caniniform teeth in both the jaws. Its close allies are represented today by forms like *Pangasianodon* Chevy of Siam and Indo-China, and *Silonopangasius* Hora of Southern India. The former, like *Silonia*, grows to a very large size, while the latter rarely exceeds a foot and a half in length.

SYNONYMY AND DESCRIPTION.

Silonia silondia (Hamilton).

1822. *Pimelodus silondia*, Hamilton, *Fish. Ganges*, pp. 160, 375, pl. vii, fig. 50.
1830. *Pimelodus silondia*, Taylor, *Gleanings in Science*, p. 171 (air-bladder).
1838-39. *Silonia lurida*, Swainson, *Nat. Hist. Fish.*, etc., i, p. 345, fig. 85; *ibid.*, ii, p. 305.
1840. *Silundia gangetica*, Cuvier & Valenciennes, *Hist. Nat. Poiss.*, v, p. 49, pl. ccccxxvi.
1853. *Silundia gangetica*, Bleeker, *Verh. Bat. Gen.*, xxv, p. 118.
1858. *Silundia gangetica*, Blyth, *Proc. As. Soc. Bengal*, p. 28.
1863. *Silundia gangetica*, Bleeker, *Ned. Tijdschr. Dierk.*, i, p. 108.
1864. *Silundia gangetica*, Günther, *Cat. Fish. Brit. Mus.*, v, p. 65.
1873. *Silundia gangetica*. Day, *Rep. Freshw. Fish Fisheries India and Burma*, p. 269.
1876. *Silundia gangetica*, Day, *Journ. Linn. Soc. London*, xii, p. 570.
1877. *Silundia gangetica*, Day, *Fish. India*, p. 488, pl. cxiv, fig. 3.
1877. *Silondia gangetica*, Beavan, *Freshw. Fish. India*, p. 136.
1889. *Silundia gangetica*, Day, *Faun. Brit. Ind. Fish.*, i, p. 145, fig. 62.
1894. *Silundia gangetica*, Bridge & Haddon, *Phil. Trans. Roy. Soc. London* (B), clxxxiv, pp. 222, 223 (air-bladder).
1937. *Silonia silondia*, Hora, *Curr. Sci.*, v, p. 352 (affinities and distribution).
1938. *Silonia silondia*, Nair, *Rec. Ind. Mus.*, xl, pp. 5-11, 6 figs. (air-bladder).

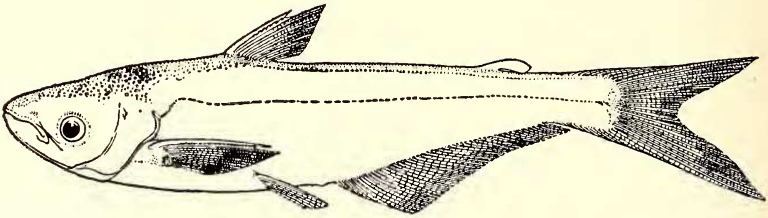
Vernacular Names:—*Silun* (Bengal, for young and half-grown), *Dhāīn* (Bengal, for larger specimens); *Silondia-vacha* (Calcutta); *Silon* (Dinajpore and Rungpur); *Baikar* (Gorakhpur); *Silond* (Punjab); *Ji-lung* and *Silond* (Ooriah and Bengali).

In the higher Bengali dialect this species is known as *Silandha* while its Sanskrit names are *Silendhra* and *Silindha* (*vide* Hamilton's list of Bhagalpur fishes).

B. 11-12; D. 1/7; A. 40-46; P. 11-13; V. 6; C. 17.

Silonia silondia is herring-shaped in its younger stages, but in the adult condition its belly becomes very bulky. The dorsal and ventral profiles are almost equally arched in the young individuals (text-fig. 2 and plate), but in full-grown specimens the ventral profile is greatly arched (text-fig. 3). The length of the head is contained from 5·0 to 5·8 times in the total length and from 4·0 to 4·6 times in the length with the caudal. The head is proportionately shorter in the larger individuals. The width of the head is about two-thirds of its length. The depth of the body undergoes considerable variations with age; it is contained from 4·7 to 7·4 times in the total length and from 4·0 to 6·0 times in the length without the caudal. The eyes are lateral in position and are visible both from above and below; the diameter of the eye is contained from 3·1 to 4·4 times in the length of the head, from

1·2 to 2·0 times in the interorbital width and from 1·0 to 1·5 times in the length of the snout. Proportionately the eyes are much smaller in larger individuals. The eyes are provided with narrow adipose lids. The head is provided with a median fontanel along its entire length which is shallow in front and somewhat deeper behind. The occipital process tapers to a fine point posteriorly; it is thrice as long as broad and is separated from the basal bone of the dorsal fin by a considerable distance. The mouth is slightly ascending. The lower jaw is broadly pointed in the middle and is somewhat longer than the upper. There is a pair of small maxillary barbels which lie in grooves and do not extend beyond the eyes. The teeth in the jaws are caniniform and arranged in two series in each jaw; those of the outer series invariably project beyond the mouth-opening. The teeth on the palate are villiform and are arranged in a U-shaped band.



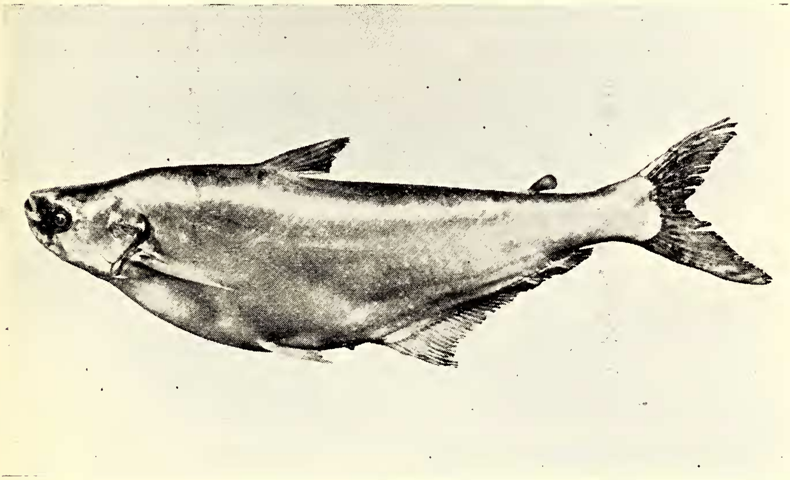
Text-fig. 2.—Lateral view of a young specimen of *Silonia silondia* (Ham.) 72 mm. in total length, collected from the river Hooghly in November 1937.

The dorsal fin is considerably, but not wholly, in advance of the ventrals; its forward position is more marked in the young than in the full-grown specimens. The dorsal spine is rather slender; it is rugose anteriorly and finely serrated posteriorly in its upper portion; it is about two-thirds the length of the head. The pectoral fin extends beyond the origin of the ventrals in young and half-grown specimens, but in larger specimens it does not reach to the base of the ventrals. The pectoral spine is similar to that of the dorsal fin. The adipose fin is small, but well-marked; it is situated above the posterior portion of the anal fin. In younger specimens it is in the posterior quarter of the length of the body, whereas in a fully mature specimen it lies in the posterior fifth of the body length. The ventrals just reach the anal opening and are separated from the anal fin by a short distance. The caudal fin is deeply forked: both the lobes are of equal length. The least height of the caudal peduncle is contained from 1·4 to 1·7 times in its length.

Colouration:—According to Hamilton (3) 'The back is of a dusky green *colour*; and, although the sides are like silver, the fish has a dirty lurid appearance, with a shade of livid hue. The back and tail fins are greenish, the others are white.' Some time after the fish is removed from water the back assumes a neutral tint while the ventral surface and sides become silvery. The opercle is shot with orange and yellow which is continued forwards to the mouth-opening. The iris is of an orange colour. The dorsal fin is of a light neutral tint; the pectoral fin is also of the same colour but is provided with an orange band at the base. The ventrals are slightly tinted with orange. The anal fin is light purple with an orange band at the base. The adipose fin is of a purple colour. The tail fin is much darker and at the base is provided with a band of light Indian red colour.

In young specimens, below 4 inches in length, the dorsal and the pectoral fins after preservation in spirit are deeply stained with black. The posterior margin of the caudal fin and a considerable part of its superior lobe are also stained with black. These colour marks gradually fade away during growth.

Distribution:—Day in his *Fishes of India* states that this species is found in the 'Estuaries of India and Burma, ascending high up the larger rivers to nearly their sources'. The collection in the Indian Museum contains no specimen of *S. silondia* from Burma. Prof. F. G. Meggitt, at my request, sent to the Museum a collection of the local Rangoon fishes, but this species is not represented in that collection. It may also be noted that Vinciguerra (8) in his account of the fishes of Burma does not record this species. It seems doubtful, therefore, whether the species is actually found in Burmese waters.[1] If, however, it occurs in Burma, it will be worthwhile to make a detailed study of the Burmese specimens and to compare them with the Indian examples



Text-fig. 3.—Photograph of a large specimen of *Silonia silondia* (Ham.), 50 inches in total length, purchased from the Calcutta market.

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[1] Macdonald (*Journ., Bombay Nat. Hist. Soc.*, xxxiii, p. 306, 1929) records the occurrence of *Silund* (*Silundia gangetica*) in the higher reaches of the Irrawadi river.

to see the effect of isolation on them, as was found to be the case in *Eutropiichthys vacha* (Ham.) and *Clupisoma garua* (Ham.) (*vide* the second and the third articles of this series).

In South India *Silonia silondia* is replaced by the allied form *Silonopangasius*, and from the information available it seems probable that *Silonia* is restricted only to the Indo-Gangetic basin of Northern India.

As the body proportions vary considerably with growth, I give below in inches the measurements of a specimen over 4 feet in length (text-fig. 3). The measurements are only approximate.

Measurements in inches.

Total length without caudal	42·5
Length of caudal	7·5
Length of head	8·0
Length of snout	2·5
Diameter of eye	1·7
Depth of body	12·5
Length of pectoral	6·7
Length of dorsal	6·5
Length of ventral	4·5
Length of anal base	14·0
Length of caudal peduncle	6·0
Least height of caudal peduncle	3·7
Distance between tip of snout and origin of first dorsal	15·5
Distance between tip of snout and origin of ventrals	15·5
Distance between ventrals and anal fin	8·0
Distance between rayed dorsal and adipose dorsal	17·0

BIONOMICS AND FISHING NOTES.

Hamilton (3) noted that *Silonia silondia* 'is very common in the Gangetic estuaries, and is considered by the natives as good eating. It commonly grows to three feet in length, and occasionally to twice that size.' This species is a common food fish of Bengal and in the Calcutta markets large quantities of this fish are sold. The majority of the specimens, as stated by Hamilton, are below three feet in length.

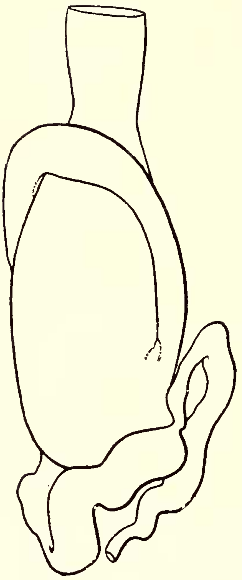
It is a voracious feeder and does considerable harm to the fisheries. The young specimens, below 4 inches in length, collected from the river Hooghly were found feeding on prawns, young fish, etc. while the largest specimen examined had full-grown *Hilsa ilisha* (Ham.) in its stomach. The stomach is a large bag-like structure about twice as long as broad (text-fig. 4); the alimentary canal is only slightly convoluted. In a young specimen about 93 mm. in length, the length of the alimentary canal was about 80 mm. In a specimen 50 inches long, the stomach measured 11 inches in length and 5·5 inches in breadth. The length of the intestine was 62 inches.

Silonia silondia probably breeds in the rainy season as young specimens from three to eight inches in total length were found to be fairly common in November-December in the catches from the river Hooghly at Nawabgunge about 20 miles above Calcutta.

Measurements in millimetres.

Total length excluding caudal	54·0	100·0	108·0	135·0	144·0	155·0	200·0	203·0	330·0
Length of caudal	Damaged	26·0	28·0	32·0	31·0	45·0	48·0	41·0	Damaged
Length of head	13·0	25·0	25·0	30·0	31·0	34·0	45·0	45·0	70·0
Width of head	8·5	15·0	16·0	20·0	21·0	25·0	30·0	31·0	48·0
Width of body	6·0	10·0	12·0	16·0	16·0	20·0	25·0	26·0	42·0
Depth of body	9·6	17·0	20·0	26·0	31·0	39·0	45·0	51·0	76·0
Diameter of eye	4·0	8·0	8·0	9·0	9·0	10·0	11·0	11·0	16·0
Interorbital width	6·0	9·4	11·5	13·0	12·0	15·5	18·0	19·0	32·0
Length of snout	5·0	8·4	9·0	11·0	14·5	13·0	15·0	14·5	24·5
Length of dorsal spine	8·0	14·0	16·0	21·0	16·0	Damaged	31·0	30·0	55·5
Length of pectoral spine	10·0	18·0	20·0	23·0	23·0	27·0	35·0	35·0	56·0
Length of maxillary barbel	3·0	4·0	3·0	3·5	4·0	3·0	5·0	4·0	3·5
Length of caudal peduncle	7·0	11·0	13·0	17·0	19·0	20·0	24·0	27·0	32·0
Least height of caudal peduncle	4·5	6·5	8·0	10·0	11·5	14·5	17·0	17 5	25·0

In the list of Gorakhpur fishes Hamilton noted under *Baikar* that 'in this district it is said never to exceed six inches in length'. Presumably Hamilton was in Gorakhpur after the rainy season when the young fish are common in the river. It also seems probable that *Silonia* ascends rivers for breeding purposes and when the waters fall after the rains it becomes stranded in large pools in the upper reaches of the river. Principally it is an estuarine fish.


Text-fig. 4.—Alimentary canal of *Silonia silondia* (Ham.).

The *Silond* Catfish is a very game fish and fights well. It frequents the same type of habitats as the *Goonch*, but prefers stronger streams and clear white deep waters. The usual bait is a spoon or a fish, but specimens have also been caught on a Mahseer fly and provided good sport with this tackle also.

Though *Silonia silondia* is primarily a fluviatile fish, it can flourish in tanks and large reservoirs as well. In the Settling Tanks of the Calcutta Corporation Waterworks at Pulta the species is very common and attains a large size. It enters these reservoirs in the egg or larval stages. From a practical fisheries point of view its cultivation should be discouraged, as it is very destructive to other types of edible fishes.

ACKNOWLEDGMENTS.

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EXPLANATION OF PLATE.

Colour sketch of the lateral view of a specimen, 214 mm. in length without caudal, of *Silonia silondia* (Hamilton) from the river Hooghly.

Immediately after the fish is taken out of water its colour is golden, but it fades quickly. The fish then becomes blue-backed with a white belly.